20 AUG 1975

MEMORANDUM FOR: The Review Staff

VIA : Deputy Director for Administration

SUBJECT : Senate Select Committee Request (ARTICHOKE/ERGOT)

1. Reference is made to the 7 August 1975 verbal request of Mr. Elliot Maxwell, Senate Select Committee Staff, to [redacted] of the Office of Security for certain documents from the Office of Security unnumbered file entitled "ERGOT," which Mr. Maxwell has reviewed. 25X1A 25X1A

2. Three copies of a portion of those documents requested by Mr. Maxwell are being forwarded herewith in an unsanitized form. These documents were not sanitized by the Office of Security in view of the need for additional coordination within the Agency prior to their release to the Senate Select Committee.

3. Further, two of those documents requested by Mr. Maxwell are Third Agency material and will be forwarded to the Review Staff via a separate memorandum.

[redacted] 25X1A

Robert W. Gambino
Director of Security

Att

Distribution:
Orig & 2 - Addressee (w/3 atts)
1 - DD/A w/o att
1 - D/Security w/o att
1 - OS Registry w/o att
1 - SAG w/att
1 - DD/PSI w/att

OS/PSI/SAG/[redacted] bp (19 August 1975) 25X1A

E2 IMPDET
CL BY [redacted] 25X1A

ATTACHMENT

Form 163d
8-66

~~L-22~~

ERP

Attached rough draft of memo I intended based on my visit to [redacted] (with exception TBS draft concerning report on Lysergic Acid L (LSD-25). Also attached is copy of DO's latest on the [redacted] case — matter interesting.

25X1A

STATINTL

D.H.

STATINTL

SS ROUTING SLIP

FOR:	I assume
Circulation	you are
Action	continuing to
Coordination	follow this
Information	✓
Filing	
Carding	ERG 01 ✓

FORM NO. 59-93
AUG 1953

(40)

Next 5 Page(s) In Document Exempt

Approved For Release 2004/03/11 : CIA-RDP83-01042R000800010006-8

SECRET

DD/P 62-1870

CENTRAL INTELLIGENCE AGENCY
WASHINGTON 25, D. C.

8391

RQM
53

ADD: ER 60T

25X1A

MEMORANDUM TO: Mr. Frank G. Wisner
Deputy Director/Plans

SUBJECT : Transmittal of Scientific Intelligence Memorandum

1. Our studies of unconventional warfare have included for some time the potential agent, Lysergic Acid Diethylamide (LSD), which appears to be better adapted than known drugs to both interrogation of prisoners and use against troops or civilians. The Soviet Bloc has the necessary supplies of ergot from which to synthesize this drug. Moreover, the Bloc is presumably in full possession of the pertinent information on it since it is commercially available and open literature carries full accounts of experimental use.

2. Because we feel that the matter may be of concern to you, we are forwarding the attached Scientific Intelligence Memorandum, which discusses briefly the intelligence implications of LSD. O/SI has in production a detailed study on this drug that summarizes the literature on the subject, recounts the results of medical experimentation with it, and deals with its possible synthesis and production. This study, "Strategic Medical Significance of Lysergic Acid Diethylamide (LSD)", will soon be available to those who have a paramount interest in the subject.

[redacted] ILLEGIB

H. MARSHALL CHADWELL
Assistant Director
Scientific Intelligence

Copies attached:

25X1A

1 - [redacted]
1 - [redacted]
1 - Willys Gibbons, C/TSS
1 - Cornelius Roosevelt, TSS

SECRET

25X1 [redacted]

CC 9

SCIENTIFIC INTELLIGENCE MEMORANDUM

POTENTIAL NEW AGENT FOR UNCONVENTIONAL WARFARE

Lysergic Acid Diethylamide (LSD)
(*N, N*-Diethyllysergamide)

CIA/SI 101-54
5 August 1954

CENTRAL INTELLIGENCE AGENCY

OFFICE OF SCIENTIFIC INTELLIGENCE

25X1 [redacted]

Scientific Intelligence Memorandum

POTENTIAL NEW AGENT FOR UNCONVENTIONAL WARFARE

Lysergic Acid Diethylamide (LSD)
(N, N-Diethyllysergamide)

This memorandum is based on intelligence available as of 1 August 1954

CIA/SI 101-54

5 August 1954

CENTRAL INTELLIGENCE AGENCY

Office of Scientific Intelligence

25X1

DISTRIBUTION

Allen W. Dulles, DCI, 1
Charles P. Cabell, DDCI, 1
Robert Amory, Jr., DDI, 1
Frank G. Wisner, DDP, 1
[redacted] C/FI, 1 25X1A
FI, 1
Willys Gibbons, C/TSS, 1
Cornelius Roosevelt, TSS, 1
Sheffield Edwards, Dir. Security, 1
[redacted] 25X1A
, 1
AD/SI, 1

25X1

POTENTIAL NEW AGENT FOR UNCONVENTIONAL WARFARE

Lysergic Acid Diethylamide (LSD)
(N, N-Diethyllysergamide)

Lysergic acid diethylamide (LSD) (N, N-diethyllysergamide), a drug derived from ergot, is of great strategic significance as a potential agent in unconventional warfare and in interrogations.* In effective doses, LSD is not lethal, nor does it have color, odor or taste. Since the effect of this drug is temporary in contrast to the fatal nerve agents, there are important strategic advantages for its use in certain operations. Possessing both a wide margin of safety and the requisite physiological properties, it is capable of rendering whole groups of people, including military forces, indifferent to their surroundings and situations, interfering with planning and judgment, and even creating apprehension, uncontrollable confusion and terror.

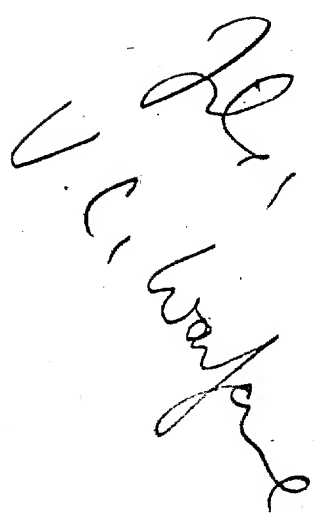
Of all substances now known to affect the mind, such as mescaline, harmine and others, LSD is by far the most potent. Very minute quantities (upwards of 30 millionths of a gram) create serious mental confusion and sensual disturbances, or render the mind temporarily susceptible to many types of influences. Administration of the drug produces in an individual such mental characteristics of schizophrenia as visual or auditory hallucinations and physiological reactions of dizziness, nausea, dilation of the pupils, and lachrymation. These reactions, however, are not necessarily obvious and only a trained observer, after giving psychological tests, may definitely ascertain that a psychogenic drug has been administered. Data, although still very limited, are available which indicate its usefulness for eliciting true and accurate statements from subjects under its influence during interrogation. It also revives memories of past experiences. In at least one case there was complete amnesia of events during the effective period.

To date, no antidote nor specific counteragent is available. The effect of LSD may, however, be shortened in duration by the use of chlorpromazine, barbiturates, or the intravenous injection of glucose. Very limited methods of detection and identification are known, such as fluorescence, staining and spectrophotometry. Although the mechanism of action of this drug in the human body is not fully understood, it is nevertheless known to interfere with the carbohydrate metabolism and to affect the central nervous system, certain of the brain hormones, and other body functions.

*OSI is now completing a detailed study of LSD that will deal with the composition of the drug, its psychogenic properties, its development, experimental use, and distribution. This study entitled "Strategic Medical Significance of Lysergic Acid Diethylamide (LSD)" will be made available to those with a paramount interest in the subject.

LSD is a partially synthesized drug and was first prepared by Sandoz Ltd., of Switzerland in 1943. The unusually complex synthesis of the lysergic acid fraction of the drug, attempted by many workers during the past 20 years, has apparently not yet been accomplished by any country. Progress in the synthesis of the drug in the United States is reported to have reached the last and most difficult stage. Completion of the synthesis will facilitate the rapid solution of many problems, such as that of an effective antidote, stability, more effective derivatives and/or combinations, more accurate dosage ranges, adequate methods of specific detection, dissemination and complete control, for which there are still urgent strategic needs.

The basic material from which LSD is prepared is ergot and the Soviet Bloc has an abundant supply of it. The preparation of LSD has been published openly in considerable detail. Further, Sandoz Ltd., has made available free samples of it for clinical testing both in this country and in Europe. It is therefore assumed that this material is available to the Bloc inasmuch as no effective geographic limitation is known.



dictated memo for record on Lebanon contact. This memo

ILLEGIB

with [redacted]

1 Apr. 54.

TRANSMITTAL SLIP

STAT NTL

(Date)

TO: RQ4/OSS [redacted]

BUILDING L ROOM NO. 2709

REMARKS:

25X1A

FROM: CD/CO/CC [redacted]

BUILDING 350 26th St ROOM NO. 1-B

FORM NO. SEP 1946 36-8

Next 3 Page(s) In Document Exempt

Approved For Release 2004/03/11 : CIA-RDP83-01042R000800010006-8

25X1

SECRET

SECURITY INFORMATION

CENTRAL INTELLIGENCE AGENCY

25X1A

INFORMATION REPORT

COUNTRY Switzerland

REPORT NO.

SUBJECT Review and Preliminary Report of Experimental Work on the Pharmacology of Lysergic Acid Diethylamide (LSD-25)

PLACE ACQUIRED (BY SOURCE) - - - -

DATE ACQUIRED (BY SOURCE) Oct 53

DATE (OF INFO.) Oct 53

RESPONSIVE TO	
1	2
CD NO.	
OO/C NO.	13184
ORR NO.	
DAS NO.	3038
OCI NO.	

DATE DISTR. 24 NOV 53

NO. OF PAGES 6

NO. OF ENCLS.

SUPP. TO REPORT NO.

25X1

THIS IS UNEVALUATED INFORMATION

SOURCE (a) US citizen, professor of pharmacognosy at a major US university.

He is well known in the field of pharmacognosy through many publications appearing in US scientific journals. His present duties include supervision of all development and research connected with the medicinal plant gardens maintained by his university. His work with the production of ergot and its alkaloids through natural means and by synthesis is recognized throughout the scientific world.

(b) US citizen, professor of pharmacology and executive officer of the School of Pharmacology at the Medical School of a major US university.

He holds a PhD in pharmacology and a degree of Doctor of Medicine. He is doing extensive research on the physiological effects of d-lysergic acid diethylamine (LSD-25) upon animals and possibly humans.

1. On 23 Jan 53 we were furnished an ample quantity of d-lysergic acid diethylamide (LSD-25) by Sandoz Pharmaceuticals, a division of Sandoz Chemical Works Ltd, to conduct extensive experiments. In addition to the LSD-25 we were given a cash grant by Sandoz to partially support our research work. Our departments of pharmacognosy and pharmacology have worked together on this project which is about two thirds completed. Following is our combined preliminary report on the Swiss controlled material:

2. "INTRODUCTION

"Lysergic acid diethylamide is a partially synthetic derivative of the ergot alkaloids obtained from the fungus Claviceps purpurea which grows as a contaminate on the fruit of rye. Lysergic acid diethylamide belongs to the ergonovine group of these alkaloids and is obtained as a condensation product of d-lysergic acid with diethylamide. It has the following structural formula:

LAST PAGE FOR SUBJECT & AREA CODES

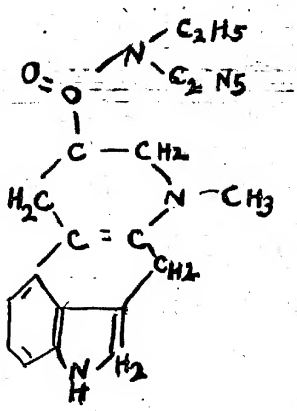
25X1

SECRET

SECURITY INFORMATION

DISTRIBUTION →	STATE	X	ARMY (SGO)	X	NAVY	X	AIR (SGO)	X	FBI		OSI/M/B	EM	

This report is for the use within the USA of the Intelligence components of the Departments or Agencies indicated above. It is not to be transmitted overseas without the concurrence of the originating office through the Assistant Director of the Office of Collection and Dissemination, CIA.



Lysergic acid diethylamide was first synthesized in 1938 by Stoll and Hoffman (1). Lysergic acid diethylamide is known by the code number LSD-25. It is soluble in distilled water but dissolves best when four parts by weight of tartaric acid to one part of LSD are used. The material used in these experiments consisted of 1cc ampules each cc containing 0.10 milligrams of LSD-25. This preparation was indicated for oral administration but in the animal experimentation the solution was administered parenterally, usually intravenously.

3. "Description of the Action of LSD-25 on Humans

"Rinkel et al (2) describes four effects of LSD-25 on humans. These are as follows:

Phase 1, prodomal phase, the period between the administration of the drug and the height of the reaction, lasting about 1 hour.

Phase 2, the height of the reaction occurring 1 to 5 hours after the drug has been given.

Phase 3, the period from the height of the reaction for several hours representing the diminishment of its effects.

Phase 4, the after-effects lasting from one to several days. Signs observable after the administration of the drug may be divided into two general groups:

a. Those referrable to the autonomic nervous system and comprising slightly increased blood pressure and heart rate, slight vasodilatation, nausea and occasional vomiting, slightly increased salivation, perspiration and lacrimation, dilatation of pupils, mydriasis, a slight increase in blood sugar, a slight and temporary increase in total white count. All of these symptoms were variable and all were not observed in any one subject. Indeed, some individuals responded in opposite and unpredictable ways. In general it may be considered that LSD-25 produces autonomic instability(3).

b. Motor symptoms were those of ataxia which was generally slight, lack of precision in movements, slight incoordination and unsteadiness and occasional faulty speech in articulation. There was occasional facial clonism with clamping of the jaws, trismus and forced laughter. In some cases with high doses there was produced catatonic

conditions with lack of facial expression and preservation of body posture (3). In human subjects the mental effects are generally marked. Consciousness is maintained although occasionally disturbed. There is a feeling of intoxication. Judgment and memory are not usually impaired. The subject is usually aware of his condition and the fact that he is experiencing effects due to the administration of the drug. Spatial orientation remains good. There is disturbance of time judgment. Attention and concentration are reduced. There is some incoherence of ideas and the faculty of expression is decreased. Euphoria is evident by disordered activity. Occasionally shown by manic behavior with unmotivated attacks of laughter. Occasionally the euphoria is passive, apathetic and hebephrenic. There may be tears, resentment, aggressiveness or passive withdrawal into indifference. Sometimes there are suicidal ideas. There is sometimes associated anxiety and paranoid trends.

Sensory perceptions are disturbed. Either by distortion or by hallucinations. Colors seem brighter and shadows more intense. In the dark there are hallucinations which generally consists of flashes of light, line patches of color or complex geometrical figures. There is false interpretation of noises, taste is usually lost, although sometimes there is a metallic or bitter taste experienced. There is a feeling of strangeness and distortion of certain parts of the body. There is a feeling of depersonalization, and there is the impression of looking at one's self from a distance, of having lost control of one's real self, as if having changed and become more or less unreal and cut off from the rest of the world. The acute effects generally wear off in six to eight hours but in most cases there is a more or less unusual mental condition persisting for the following day or for the following week. Sometimes the euphoria lasts for several days and there are periods of dreaminess alternated with depression. Becker (4) and Rinkel et al (2) state that there are two main types of psychiatric effects of LSD-25 to be distinguished:

a. Manic, expansive reaction with psychomotor excitement, euphoria and less frequently depression.

b. A schizophrenic reaction with slowing of mental processes, inhibitions, autism, depersonalization and hallucinations.

The majority of subjects present a mixture of these two extreme types.

"Pharmacological Effects on Animals

"Original observations on LSD-25 were made in mice. These animals showed excitatory effects of the drug and are most marked in 'waltzing' mice (5). In the dog there are evidences of autonomic effects as seen in salivation. Higher doses produced motor rigidity. In rabbits there is evidence of motor excitement in medium doses. It has been reported that LSD-25 resembles ergonovine in that it produces contraction of the rabbit uterus. It has been reported to have no blocking action to adrenalin in contrast to ergotamine.

"EXPERIMENTAL PROCEDURES AND RESULTS

"Description of Effects of LSD-25 in Animals

"Rabbit administered 60 gamma per kilogram intravenously showed after the lapse of three to five minutes augmented placing reflexes and a slightly increased vigor of the righting reflex. This effect lasted from 10 to 15 minutes after which there was loss of the placing reflexes and loss of the righting reflex. There was dilatation of the pupil and loss of the response to light. Cats administered 50 to 100 gamma per kilogram showed increased alertness and appeared to freeze in attention to small movements of objects. Later there was a tendency for the animal to retire into dark corners where it remained immobile. There was dilatation of the pupil and absence of reaction to light. The entire duration of the effect was about one hour after which the animal appeared to be normal. Dogs administered 50 to 100 gamma per kilogram showed incoordination in walking and evidence of excitement. This was followed by paralysis and dragging of the hind-limbs on

walking but the animal preferred to remain immobile staring at some object or corner of the room. These effects lasted one half to one hour after which there was complete recovery of walking and running movements.

6. "Action of LSD-25 On Spinal Reflex Pathways

"Ipsilatoral Responses in Frogs. Large Rana Pipien frogs were used. The spinal cord was transected at the level of the medulla by means of a sharp scalpel. The wound was packed with a pledget of cotton to control bleeding. The frog was suspended from a stand by means of a hook through the lower jaw and allowed to hang free. Stimulation was applied to one or the other of the lower limbs by means of an electrode consisting of two parallel brass rods, 3 mm in diameter separated 5 mm apart. The frog's foot was placed between the electrodes and stimulated for one second with varying voltages from a Harvard inductorium. The endpoint, or threshold voltage, was recorded as a point at which a reflexing response occurred in the leg efficient to withdraw it from between the electrodes. This was recorded in 'stimulation units' each unit representing a 1 cm gap between the primary and secondary cause of the inductorium. The higher the numbrical value of the stimulation units (SU) the lower the actual voltage. Between the application of test stimuli the frog's foot and leg was immersed in a beaker of normal saline. After a control period of 30 to 60 minutes during which the threshold voltage as measured by the stimulating units was determined, the solution of LSD-25 was introduced into the anterior lymph sac. Results of these experiments are given in Table 1.

7. "Table 1. Ipsilateral flexion response of frogs with cord transection below the medulla.

"Experiment	Dose in gammas	Duration of exp. in minutes		Mean threshold before LSD*		Mean threshold After LSD*		Threshold Difference**	
		L	R	L	R	L	R	L	R
1	5	15	30	14	11	9	9	+5	+2
2	5	45	60	13	11	11	10.5	+2	+0.5
3	5	15	15	12	11.5	11	12	+1	-0.5
4	5	60	60	11.5	11.5	13.5	12	-2.0	-0.5
5	25	120	135	13	13	12	15	+1.0	-0.5
6	25	120	120	16.5	15	11.5	11.5	+5.0	+3.5
7	25	30	30	12	12	10	12	+2.0	0
8	25	90	90	15	15	12.5	16	+2.5	-1.0
9	50	180	180	11	12	13	10	+2.0	-2.0
10	100	30	30	11	11	10	10	+1.0	+1.0
11	100	75	75	15	13	11.5	10	+3.5	+3.0
12	100	90	90	14	13	12	10	+2.0	+3.0
13	200	45	60	13.5	14	11.4	10.5	+2.0	+2.5
14	200	105	105	13	15.5	12	18.5	+1.0	-3.0
15	200	120	120	12	13.5	17	11	+2.5	-5.0

*Threshold voltages are recorded in 'stimulation units' (SU)

**Positive number are indicative of a higher threshold; negative figures indicate lowered threshold.

8. "The general results may be summarized as follows:

a. The threshold voltage required for evoking ipsilateral flexion responses was in most cases higher after instillation of LSD-25. In some cases with higher doses there was complete abolition of response to the stimulus regardless of the increase in voltage.

b. The preparation studied represents essentially a three-neuron reflex pathway. LSD-25 appears to act directly upon the neurons at the synapse. Its effect is characteristic of blocking or retarding conduction at this point.

c. These experiments in frogs leave the possibility of inaction at the myoneural juncture which will be considered in the following experiment.

9. "Effect of LSD-25 on the Spinal Cat Flexor Response.

"A decapitate cat preparation was used in the following experiments. The cat was anesthetized with ether. The trachea was cannulated, the common carotid arteries were isolated and ligated anteriorly and posteriorly and sectioned between the ligations. Using a 30 amp cautery the muscle structures and other tissues were divided exposing the spinal column at level C_2 or C_3. A heavy cord or wire was then tied around the exposed bony spinal column and wound tightly to reduce hemorrhage by compressing the vertebral arteries. The spinal column and cord was then cut through anterior to the ligature. As soon as possible after this cord section artifical respiration was begun. A blood pressure was recorded from one of the common carotid arteries. A venous cannula for the administration of the drug was introduced into the right femoral vein. The left femoral nerve was exposed and sectioned and the tendenous insertion of the left tibialis anterior muscle was isolated and connected to a recording lever. The left sciatic nerve was exposed. The nerve to the ham string muscles was sectioned and arranged for stimulation. The muscle twitch was recorded after the bone of the left leg was exposed and pinned securely. Warm saline packs were used to protect the exposed nerve structures between the application of stimulations. In this preparation it is possible to elicit muscle contractions as the result of stimulation at two points. The stimulation may be applied to the nerve leading directly to the muscle in which case the effect of the agent on the myoneural juncture may be tested; or the stimulation may be applied to the sciatic nerve in which case the pathway traverses the spinal cord. It was possible to show that the LSD-25 did not affect transmission to the muscle through the myoneural junqture, the threshold stimulus remaining constant after the administration of the drug. The LSD-25 did affect transmission through the spinal cord synaptic junctures, diminishing the conduction and eventually blocking this pathway entirely. It was not possible to secure recovery of the preparation and restoration of the pathways and it is believed that the effect of the agent extends beyond the life of the decapitate preparation.

10. "Symphatholytic Effects of LSD-25

"Using isolated rabbit uterus strips maintained in a standard smooth muscle bath the LSD-25 - epinephrine antagonism was studied. After the determination of a uniform response to a standard amount of epinephrine quantities of 4, 5, 10, 15, and 20 gamma of LSD-25 were added to the 50-ml bath the epinephrine response of the smooth muscle was depressed in the same way as it is depressed by ergotoxin. On one strip, 20 gamma of LSD-25 produced a depression of the epinephrine contraction approximately comparable to that produced by 3 gamma of ergotoxin ethanosulfate. This indicates that the quantity of LSD-25 required to produce equivalent effects of ergotoxin is approximately six to seven times greater.

11. "SUMMARY

a. Lysergic acid diethylamide produces evidences of autonomic effects and motor effects in intact rabbits, cats, and dogs.

b. It produces blocking of spinal synaptic transmission in frogs and cats. There is no effect at the myoneural juncture.

c. It is capable of diminishing the epinephrine effect on isolated rabbit uterus.

1.

"REFERENCES

1. Stoll, A and Hoffman, A Helv Chim Acta, 26: 944 1943.

2. Rinkel, M De Shon, H J Hyde, R W and Solomon, H C Amer Jr Psychiat, 108 572, 1952.

3. De Shone, H J Rinkel, M and Solomon, H C Psychiat. Quart 26: 33, 1952.

4. Becker, A M Wien Z Nervenhk, 2: 402, 1949.

5. Rothlin, E and Cerletti, A Helv Physiol, 10: 319, 1952"

- end -

25X1

SECRET
SECURITY INFORMATION

CENTRAL INTELLIGENCE AGENCY

25X1A

INFORMATION REPORT

COUNTRY UK/Switzerland

SUBJECT Experimental Psychoses and Other Mental Abnormalities Produced by Drugs

PLACE ACQUIRED (BY SOURCE) ---

DATE ACQUIRED (BY SOURCE) 11 Aug 51 to Sep 53

DATE (OF INFO.) Sep 53

REPORT NO.

RESPONSIVE TO	
1	2
CD NO.	
OO/C NO.	13184
ORR NO.	
DAS NO.	3038
OCI NO.	

DATE DISTR. 24 Sep 53

NO. OF PAGES 1

NO. OF ENCLS.

SUPP. TO REPORT NO.

THIS IS UNEVALUATED INFORMATION

SOURCE US citizen who is on the faculty of the medical school at a major US university.

He is a professor of psychiatry who has done considerable research on the effects of various drugs on the central nervous system. One of his major fields of interest is research on the psychic changes brought about by dosages of d-lysergic acid diethylamide.

1. I have read with interest the extract from the British Medical Journal dated 11 Aug 51 and titled "Experimental Psychoses and Other Mental Abnormalities Produced by Drugs." The author, W Mayer-Gross, MD, FRCP, director of Clinical Research, Crichton Royal, Dumfries, UK, is well qualified to discuss this subject.

2. Our university is conducting clinical studies on d-lysergic acid diethylamide (LSD-25) which is an exclusive product of Sandoz Ltd, a Swiss pharmaceutical company. The purpose of these investigations is to determine the human and animal physiological and psychic reactions to this substance. LSD-25 is a synthetic amide prepared from natural d-lysergic acid and diethylamide. D-lysergic acid is the basic component of the alkaloids of ergot. Dr Mayer-Gross describes the mental reactions following dosages of mescaline, a substance which has been described in medical journals for many years. It is his opinion that the symptoms produced by LSD-25 appear to be close to those produced by mescaline despite the wide chemical difference between the two products. LSD-25 is many times stronger than mescaline or than any other known substance similar in nature.

3. Dr Mayer-Gross sees value in the self use of LSD-25 or mescaline by psychiatrists as they provide a safe means for them to be temporarily transformed into the strange world of some of the mental patients they are trying to treat. Our research on LSD-25 has not been thorough enough to make this same statement -- we have not used the material on human subjects. We do feel, however, that psychic reactions from mescaline and LSD-25 are somewhat the same.

[Available on loan from the CIA Library is the text of W Mayer-Gross, MD, FRCP, article entitled "Experimental Psychoses and Other Mental Abnormalities Produced by Drugs," dated 11 Aug 51.]

LIBRARY SUBJECT & AREA CODES

- end - 644.5 22M Uncons War

25X1

SECRET
SECURITY INFORMATION

DISTRIBUTION →	STATE	ARMY	NAVY	AIR	FBI	OSI	MED. CHEM.
	X	X	X	X			X

Return to Ames

SECRET

SECURITY INFORMATION

CENTRAL INTELLIGENCE AGENCY 25X1A

INFORMATION REPORT

COUNTRY USSR

SUBJECT Soviet Organic Chemist: I Rapoport

PLACE ACQUIRED (BY SOURCE) - - - -

DATE ACQUIRED (BY SOURCE) Aug 53 and earlier

DATE (OF INFO.) Aug 53

REPORT NO

RESPONSIVE TO	
1	2
CD NO.	A-1340
OO/C NO.	Guide 72
ORR NO.	
DAS NO.	633
OCI NO.	

DATE DISTR. 24 Sept 53

NO. OF PAGES 2

NO. OF ENCLS. 25X1

SUPP. TO REPORT NO.

THIS IS UNEVALUATED INFORMATION

SOURCE Naturalized US citizen of Russian birth, a chemist and fluent in the Russian language.

He holds BS, MS and ScD degrees in chemistry from US universities of high standing and is currently teaching chemistry and doing original research in organic chemistry at a US polytechnic institute. He was formerly a research chemist for two large US industrial corporations. For the past several years he has been translating and digesting articles of scientific interest appearing in Soviet publications. He is a long-time source whose great number of reports have been, practically without exception, of intelligence interest and have received high evaluations.

Interest has been expressed in your comments [redacted] on the work of I Rapoport dealing with mutations. Can you supply Rapoport's full name, a list of his publications and his present position? 25X1A

1. I am not surprised at the interest manifested in Rapoport's work. As I have stated, his work on mutations may be extremely significant from a BW standpoint.

2. Unfortunately, my knowledge of Rapoport is confined to the meagre information given in Soviet scientific journals. Such journals rarely give the full names of an author but merely list a patronymic and one or more initials. Moreover, the listings are not always uniform or consistent. In the following list of publications the patronymic "Rapoport" is sometimes preceded merely by the initial "I". At other times, it is preceded by the initials "I A". I am unable to state whether "I Rapoport" and "I A Rapoport" are one and the same individual.

3. The following is a list of all publications attributed to "Rapoport" which I have seen in Soviet scientific literature:

L Shtern and I Rapoport, Compt rend sec biol USSR, 97,366-8 (1927) - Concerning the mechanism of passage of various substances from the blood into the cerebrospinal fluid.

L Shtern, I Rapoport and L Kremlev, Compt rend sec biol USSR, 97,644-5 (1927) - Effect of thyroidectomy and castration on the function of the hemato-encephalic barrier.

SEE LAST PAGE FOR SUBJECT & AREA CODES

H W

25X1

SECRET

SECURITY INFORMATION

DISTRIBUTION →	STATE		ARMY	X	NAVY	X	AIR	X	FBI		051/8 Holt EV		

I A Rapoport, Bull biol med exptl, URSS 7,415-17 (1939) - Specific morphoses in Drosophila induced by chemical compounds.

I A Rapoport, Compt rend acad sci, URSS, 27, 369-72 (1940) - Substances which disturb the symmetry in the organism.

I A Rapoport, Compt rend acad sci, URSS 27, 1033-6 (1940) - Effect of thymonucleic and nucleic acids and of some of their components on mutations.

I A Rapoport, Bumazhnaya Prom 18, No 7, 34-8 (1940) - Montan wax, its properties and use in the paper industry.

I A Rapoport, Sbornik Dikhloretan, 92-5 (1939) - Regeneration of oils from wiping materials.

I A Rapoport, Sbornik Dikhloretan, 96-9 (1939) - Degreasing metallic shavings.

I A Rapoport, Sbornik Dikhloretan, 52-91 (1939) - Use of dichloroethane in extraction processes.

I A Rapoport, Sherstnyanoe Delo, 19, No 5, 12-13 (1939); also 18, 20-2 (1939) - Extracting wool-spinning waste with dichloroethane.

I A Rapoport, J Chem Ind USSR, 18 No 22, 8-10 (1941) - Extraction of Ukrainian brown coal.

I A Rapoport, J Gen Biol USSR, 4, 65-72 (1943) - Oxidation and mechanism of action of mutational factors.

I A Rapoport, Compt rend acad sci URSS 54, 65-7 (1946) - Carbonyl compounds and the chemical mechanism of mutations.

I A Rapoport, J Gen Biol USSR 8, 359-79 (1947) - Chemical reactions with the protein amino groups in gene structure.

I A Rapoport, Doklady Vsesoyuz, Akad Sel'sko-Khoz, Nauk im V I Lenina, 12, No 10, 12-15 (1947) - Inheritance changes taking place under the influence of diethyl sulfate and dimethyl sulfate.

I A Rapoport, Byull, eksptl Biol Med 23, 198-201 (1947) - Derivatives of carbaminic acid and mutation.

I A Rapoport, Doklady Akad Nauk SSSR, 60, 469-72 (1948) - Action of ethylene oxide, glycidol and glycols on gene mutations.

I A Rapoport, Doklady Akad Nauk SSSR, 59, 1183-6 (1948) - Alkylation of gene molecules.

I A Rapoport, Doklady Akad Nauk SSSR, 61, 713-15 (1948) - Mutations under the influence of unsaturated aldehydes.

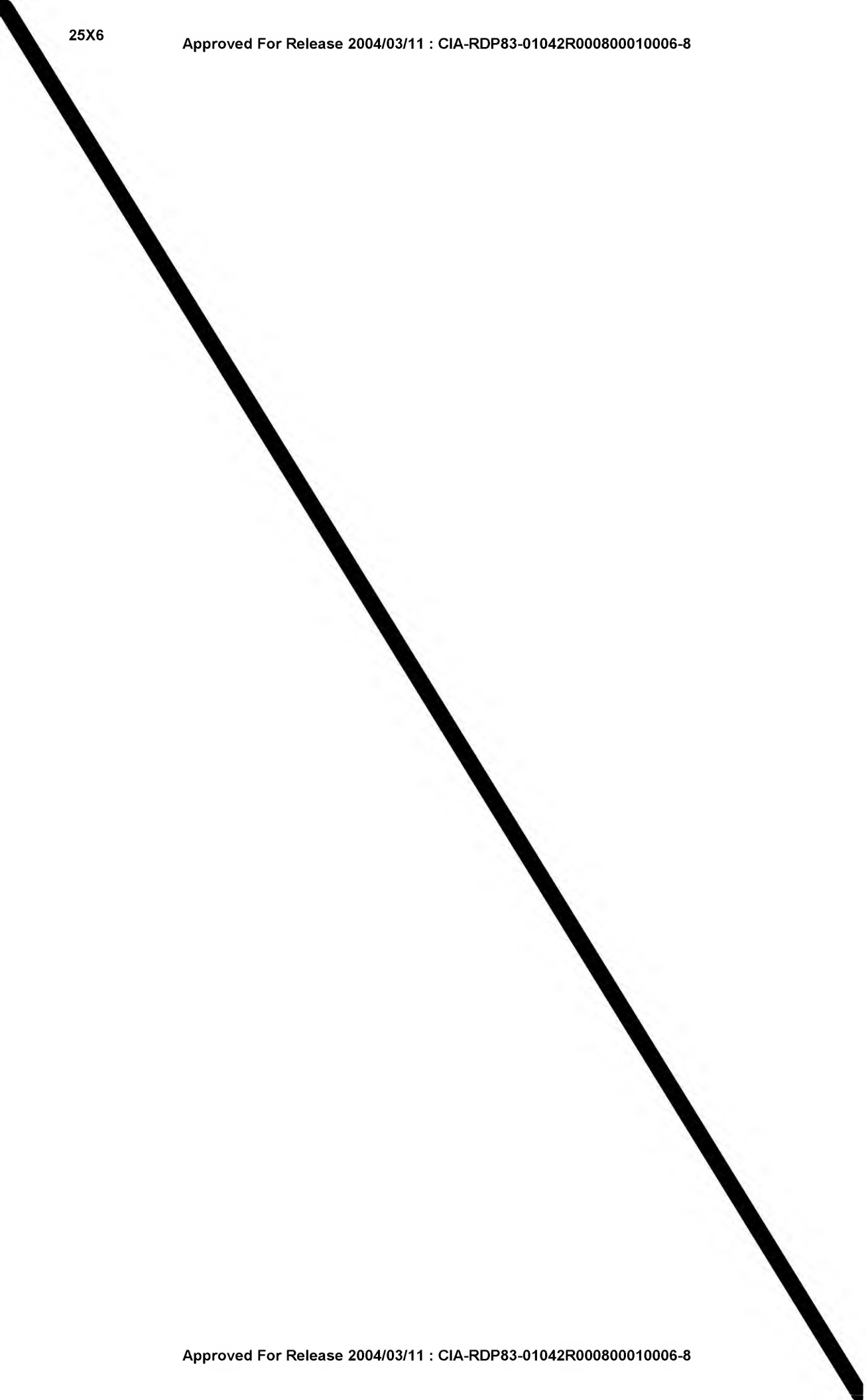
I A Rapoport, Am Naturalist, 81, 30-7 (1947) - Synthesis of gene-products in equimolar quantities.

4. I have no information concerning Rapoport's present connection or position. I know only that he was, at one time, connected with the Institute of Organic Chemistry of the Academy of Sciences of the USSR in Moscow.

- end -

LIBRARY SUBJECT & AREA CODES

614.04 N 614.12 N 614.02 N



b. LSD-25 has the potential of being an aid in the treatment of mental patients.

c. LSD-25, if improperly used is a dangerous material -- it creates serious mental confusion and makes the human mind temporarily susceptible to suggestions. No research has been done to determine what permanent damage could be done to the human mind if the material was administered over extended periods.

d. LSD-25 could be used in the interrogations of unwilling subjects for the purpose of getting them to "confess" as the material stimulates subjects to talk more freely.

e. LSD-25, because of its potency, could possibly be used in the contamination of food and water for the purpose of rendering whole groups of people (including troops) mentally indifferent to their surroundings and situation.

5. Our investigations thus far substantiate the findings of other investigators but we have carried our research on animals much further than others working on LSD-25. We can take no serious exception to the printed material furnished us by Sandoz Ltd which gives a summary of extensive research on LSD-25 as of November 1952 and is quoted below:

6. "D-LYSERGIC ACID DIETHYLAMIDE (LSD-25)

"CHEMICAL CONSTITUTION:

D-lysergic acid diethylamide is a partially synthetic derivative obtained by condensing D-lysergic acid, extracted from ergot of rye, with a secondary amine, diethylamine. Thus LSD-25, first prepared in 1938 by A Stoll and A Hofmann [1], /see notes at end of report/ belongs to the ergonovine group. LSD-25 is soluble in distilled water, a process facilitated by adding crystalline tartaric acid (four parts of tartaric acid to one of LSD).

7. "EFFECTS OF LSD ON ANIMALS:

In certain respects LSD resembles ergonovine. It exerts a uterotonic action (the uterotonic effect of LSD on the rabbit uterus in situ is 7/10 of that of ergonovine). LSD exerts no adrenosympathicolytic action (a contrast to the alkaloids of the ergotamine and ergotoxine groups) and its toxicity is similar to that of ergonovine and ergotamine (the LD 50 in mice of intravenous LSD-25 is 65 mg/Kg, of intravenous ergotamine 84 mg/Kg and of intravenous ergonovine 125 mg/Kg.)

However, LSD-25 may be clearly distinguished from all the other ergot alkaloids so far investigated in other respects. The injection of a small dose of LSD-25 into the anaesthetized rabbit produces motor excitation. In the dog the first apparent effects of LSD-25 are of a vegetative nature, e g copious

salivation, without any significant change in affective behavior. High doses of LSD-25, like bulbocapnine, cause motor rigidity in the dog and cat, a condition reminiscent of catatonic states.

On the normal mouse, LSD has a weak excitatory action which appears only at a subtoxic dosage level. Mice with hereditary waltzing anomaly are more sensitive to this drug. Subcutaneous doses of no more than three percent of the LD 50 increase the general excitatory state, but with simultaneous suppression of waltzing movements (ROTHLIN, CERLETTI 25).

DELAY et al[15] studied the effect of LSD on the electrocorticogram of the rabbit. Doses of 40 mg/Kg (average) injected intravenously or into the carotid artery caused marked or even complete flattening of the tracing. The effect was progressive, setting in after approximately one minute and lasting one - two hours. The effect was clear-cut even after doses as small as 18-20 mg/Kg. An identical effect was noted after massive doses (300-600 mg/Kg). There was simultaneous marked motor hyperexcitability.

LSD inhibited the spontaneous rhythmic activity; it did not prevent the response to electrical stimulation, the epileptic spikes, the bursts of rapid spikes produced by barbiturates or cortical trauma. Of the vasodilator substances investigated, nicotinic acid, dibenamine, hexamethonium, priscol and alcohol did not modify the effect of LSD. Acetylcholine, given intravenously, in doses of 20-40 mg/Kg, caused the reappearance of bursts of basal rhythm. Urethane and chloralose did not modify the effect of LSD.

8. "EFFECTS OF LSD ON HUMAN BEINGS:

The above mentioned animal experiments do not give any hint whatsoever as to the mental effects exerted by LSD in human beings. Hofmann discovered these effects by accident and then carried out investigations on himself which were reported by W Stoll[2]. Studies on the effects of LSD 25 in normal subjects have been carried out by W Stoll[2], Condrau[5], Becker[6], Georgi et al[8], Rinkel et al[10], Matkfi[11], Mayer-Gross[17], Weil[16] and other research workers, whose reports have not yet been published.

The effects of LSD have been investigated in psychotic patients by Stoll[2], De Giacono[3], Forrer and Goldner[4], Condrau[5], Busch and Johnson[7], Hoch et al[19], Savage[24], and Belsanti[27]. Rostafinski[9] has made some experiments with LSD in epileptic patients.

As far as systemic effects are concerned, both normal and psychopathic subjects respond in almost the same manner to LSD and may, therefore, be considered as one group. However, this is not the case with the mental effects, and therefore normal and psychopathic patients have to be considered separately in this respect.

a. Active and maximum doses: Up to the present, LSD has always been administered orally, generally in the morning on an empty stomach. LSD is active in very small doses. In certain subjects the characteristic effects are observed after the administration of a dose as small as 20 µg (microgram = 0.02 mg). A dose of 40-100 µg (about 1 µg/Kg body weight) is active in most cases. Doses as high as 500 µg (= 0.5 mg) or 6 µg/Kg body weight have been well tolerated by psychopathic patients[3,4].

In general psychopathic patients show greater resistance to the systemic and mental effects of LSD than do normal subjects.

b. Onset and duration of action: The first effects of an active dose of LSD generally appear within one-half - one hour (maximum three hours). Maximum effectiveness is reached, on an average, after two hours and the effects persist for three - six hours. Delayed effects may be observed for one or more days but rarely for more than one week. Rinkel et al[13] recognize four phases in the reaction to LSD. Phase I, the prodromal phase, represents the period between the administration of the drug and the height of the reaction. It lasts about one hour. Phase II represents the height of the reaction, occurring one-five hours after the drug had been given. Phase III was the period from the end of the height of the reaction until evening. Phase IV comprised after-effects lasting one to several days.

c. Systemic effects: Distinction may be drawn between vegetative symptoms, fairly slight effects on metabolism and motor symptoms.

Vegetative symptoms:

Giddiness [2,5,7], "empty-headedness" [5,10], occasionally headaches [2,5,7]. In isolated cases general malaise [2,5,6], feeling of weakness [5,10], fatigue [5], tremor and shaking [10].

Effects of LSD on:

(1) Cardiovascular system:

Blood pressure: Slightly increased, within physiological limits [4,8,11], or not modified [10]; less frequently slightly decreased [2,5]. In exceptional cases danger of collapse [5]. Two patients given LSD daily developed profound circulatory depression [24].

Heart rate: increased [4,7,8,11] or not modified [10]. In isolated cases decreased [2,3,5].

Vasomotor functions: flushes of vasodilatation [2,4,5,7,10] or facial pallor, sometimes acrocyanosis [5].

Subjective impressions: sometimes palpitations [2,5] or precordial discomfort [5].

(2) Digestive system:

Anorexia, sometimes nausea [2,4,5,6,7,10,19] occasionally vomiting [4,5,7,19], and in isolated cases lyocrexia [5].

(3) Hepatic function:

Only very slight changes observed. Whereas the usual laboratory tests such as the Takata-Ara and the Hijmans v d Borg reactions, the Quick test (excretion of bippuric acid following ingestion of sodium benzoate) or the caphalin-cholesterol flocculation test show no change [3,4,8,27], the Snapper test (determination of glucuronic acid in the urine after administration of cinnamic acid) reveals slight, temporary disturbance of hepatic function [8,27]. It should be noted that the Quick test and the Snapper test are positive in schizophrenia and mescaline intoxication [8]. Subjects in whom even only a slight modification of hepatic function is present (e g cases where there are protracted sequelae of infectious hepatitis) make a very marked response to LSD [8].

(4) Respiration:

Usually not changed [2,3,4,5] ; respiration sometimes deeper and slower [2,3,5].

(5) Urinary system:

No changes in composition of urine [4,5]. Diuresis sometimes increased [2]. In isolated cases retention of urine followed by polyuria when the effects of LSD had worn off [6].

(6) Genital system:

In isolated cases uterine cramps [10].

(7) Temperature:

No change, in exceptional cases increased by 1°F [4]. Feeling of warmth [2,5,6,19] or cold [2,5,6,7,1], sometimes periods of shivering [10,19].

(8) Saliva secretion:

Often increased [4,5,6,8,10].

(9) Sweat secretion:

Often increased [2,5,6,8,10]

(10) Lacrimal secretion:

Sometimes increased [4].

(11) Pupils:

Generally dilatation [2,4,7,8,10,11,19], sometimes impairment of reaction to light [4]; mydriasis less pronounced when LSD instilled into the conjunctival sac [4].

(12) Blood picture:

Temporary increase in total white blood cell count without modifications in the differential count or relative neutrophilia [4,27].

Slight increase in potassium blood values, no change in calcium blood values [3,27]. Savage [24] observed some tendency for anaemia to appear during prolonged treatment (20-100 ug daily for one month).

(13) Blood sugar:

Slight rise, within physiological limits [4]; less frequently a fall [3]. In 24 subjects Mayer-Gross et al [17,21] found that LSD caused a slight,

transitory increase in the glucose and hexosemenophosphate levels in the blood. Otherwise carbohydrate metabolism was not affected. This group of investigators believe that by an anti-enzyme action, LSD interrupts the break down of glycogen at the hexosemenophosphate state. The intravenous injection of 33% glucose solution modified the reaction to LSD [21].

Aggregate of vegetative effects:

LSD tends to produce amphotonia. The increase in blood pressure and heart rate and the dilatation of the pupils suggest an increase in sympathetic tonus. The nausea and the periods of vasodilation suggest parasympathetic hyperactivity.

However, it should be noted that there are great differences from individual to individual. Some subjects respond to LSD with a fall in blood pressure, bradycardia and other symptoms suggestive of sympathetic inhibition [3,13].

In general, LSD produces vegetative instability [13] which may tend either to sympathicotonia or to vagotonia, depending on the individual subject.

Motor symptoms:

LSD causes disturbances of voluntary motor functions (which are generally slight) and also modifications of reflexes.

Ataxia: generally not pronounced, lack of precision in intentional movements, slight degree of incoordination, occasionally unsteadiness of gait [2,4,5,6,8,11]. Occasionally faulty speech articulation [2,5,8,10,10]. Romberg's sign: sometimes slightly positive [2,5,27,27]. Sometimes tremor of the hand and twitching of the eyelids [5,7,8,27]. Often facial clonism, cramps of the jaws, trismus and forced laughter [2,5,6,7,8,10]. Sometimes hyperactivity of tendon reflexes [2,4,5]. Sometimes motor excitement [3,5,7,10], in exceptional cases athetoxic movements [5]. In certain cases high doses (300-500 mg) produce catatonic conditions with a lack of facial expression and perservation of body posture [3].

Aggregate of motor symptoms:

The most frequent motor effect of LSD may be described as a slight degree of muscular hyperexcitability accompanied by more or less pronounced signs of incoordination. The catatonic effect of high doses has, as yet, only been studied

in five cases.

d. Mental effects in normal subjects:

Consciousness, orientation: Consciousness is generally maintained but occasionally slightly clouded [2,6,14]; a feeling of intoxication [5], often occurring in a wave pattern of outbursts [6]. In exceptional cases short periods of confusion [2].

As a rule, judgment and memory are not impaired. The subject is conscious of his condition and does not lose sight of the fact that what he is experiencing is due to the drug ingested [2,5,6,8,10,11]. Certain subjects notice that their powers of self-observation and introspection are increased [6].

Spatial orientation remains good. The notion of duration of time is often disturbed, time seeming to pass too quickly or too slowly [2,5,6,8,10,11].

Ideation: may be accelerated, accompanied sometimes by incoherence, and "running away" of ideas [2,5,10]; in other cases ideation is slowed down and the faculty of expression inhibited [2,8,10]. Often a tendency to preoccupation with one idea [2,5]. Attention and concentration are reduced [2,5,6,8,11].

Affectivity and behavior: Several types of reactions may be observed:

(1) Marked euphoria made evident by disordered activity, manic behavior, more or less unmotivated attack of laughter, or even involuntary maniacal laughter [2,5,6,10,14,17]. Less frequently the euphoria is passive, apathic and hebephrenic [8,10,11].

(2) Depression which may be demonstrative with tears, resentment, aggressiveness [2,6,10,14] or passive with negative withdrawal into the self, autism, apathy and even complete indifference [2,6,10,14], sometimes suicidal ideas [2,6].

(3) Alternate phases of euphoria and depression [2,5,17].

In addition to these effects, there is sometimes associated anxiety [24], paranoid trends [13], or the fear that the abnormal state will persist or will be noted by a third party [2,5,6].

In general, under the effect of LSD an enhancement of the previous affective state whether constitutional or temporary may be observed [5,6]. The euphoric reaction seems, however, most frequent [2,8,10].

Behavior is controlled by affectivity. In cases of hypomanic euphoria, the disordered activity is often accompanied by logorrhoea nd loss of inhibition; the subject cannot prevent himself from saying what he thinks [2,5,6] and seeks affective contacts. On the other hand, in cases of depressive schizoid reaction often all affective contact is suppressed and the apathy may even develop into a state of stupor [6,10].

Sedative effects on sexuality [2].

Sensory perceptions: Disturbances of perception are frequent and sometimes very pronounced. Either the object perceived is distorted or there are hallucinations generally of an elementary nature.

Vision: Often the objects appear distorted, perspective is incorrect, distances are overestimated, colors seem brighter, shadows very intense and contours very clear-cut [2,5,6,8,11,14]. Less frequently the outline of the object seen is less distinct and colors are dull [6].

Certain subjects experience hallucinations especially if they are in the dark and their eyes are closed. These hallucinations generally consist of flashes of light, lines, patches of color, sometimes more complex geometrical figures, objects, flowers and animals [2,5,8,10,11]. In exceptional cases the visual hallucinations are provoked by auditory stimuli [2].

Hearing: Often hyperacusia and false interpretation of noises [2,5,6,8,10,11,19]. Less frequently true auditory hallucinations, e g sound of a bell [6,10,10].

Taste and smell: Taste is often affected. Food and cigarettes seem tasteless. Sometimes metallic or bitter taste [2,5,6,8,10]. In rare cases olfactory hallucinations, e g garlic odor [11].

Touch: Frequently distortion, hypoesthesia and paresthesia: things feel different [2,6]. In isolated cases true tactile hallucinations, e g sensation of being wet from urine [10].

General bodily feelings: Feeling of strangeness or distortion of certain parts of the body [2,5,6,8,10,14]: the subject has the impression that his head is enormous, that one limb is excessively long or separated from the body, that his nose is not in its right place, that his arm "no longer belongs to him" or that his body weight has decreased or increased.

Personality: In certain subjects LSD produces a feeling of depersonalization or of split personality of a clearly schizophrenic nature [2,5,6,10]. Impression of looking at one's self from a distance, of having lost control of one's real self, of having changed and become more or less unreal and cut off from the rest of the world. These phenomena are generally associated with the cenesthetic disorders as well as with autism, withdrawal and indifference. These personality disorders are less frequent in subjects who make a manic euphoric or depressive response to LSD.

Psychological tests: Rinkel [10,13] carried out Rorschach's test on five subjects under the influence of LSD. The results of the test confirmed the clinical observations of the effect of LSD in each of the five individuals: autism, negativism, weakening of powers of logical reasoning, anxiety, depression, and aggressiveness. Another test ("concrete-abstract thinking") consisting of noting the reactions of the subjects to a series of aphorisms also gave responses reminiscent of those of schizophrenic patients, (predominance of concrete responses; abstract responses could be obtained with effort but were characterized by overgeneralized and tangential thinking).

Rimmel did not employ these tests in persons who made a manic depressive response to LSD. In an alcoholic, a Rorschach's test carried out just after the subsidence of the LSD effects showed profound changes over the previous tests [26].

Matkfi [11] studied the effects of LSD on himself. He made a series of drawings supposed to represent the same person (Zeichentest') while under the influence of LSD and found that his strokes became quicker, sometimes stereotyped, and the drawing became larger, and even went off the paper. In spite of all his efforts, he could not coordinate his drawing with what he saw, whether it was normal or not. When the height of the LSD effect was reached, he made a drawing of his visual hallucinations.

Electroencophalogram: EEG tracings have been taken, as yet, in only about 15 cases. There have been slight [10,13] or no changes. Rinkel [4] found, in general, [10,13] an increase in alpha rhythm of one-three waves per second, but in one very relaxed subject the alpha rhythm was slowed by two waves per second. In eight cases out of nine he noted a pronounced increase in muscle activity.

Delayed Effects: The 'intoxication' of LSD generally wears off within six-eight hours, but in practically every case a more or less unusual mental status persists for one-half to one day and sometimes for more than one week.

In the evening after the experiment, euphoria, logorrhoea, difficulty of concentration and sometimes great fatigue are noted. The subjects generally sleep well, but the following morning certain of them complain of a "hangover," similar to that produced by excessive amounts of alcohol. However, by this time most subjects have returned to their normal status [2]. Sometimes the euphoria lasts several days [6].

Less frequently a depressive state is observed [2]. This may last several days [6,8]. One subject exhibited periods of dreaminess (with feelings of strangeness, of "deja vu" and disturbed general bodily feelings), alternating with phases of depression [6], after a single dose of LSD. These delayed effects often occurred in waves [13].

Aggregate of psychic effects in normal subjects: The symptoms produced by LSD have been considered by W Stoll [2] as the expression of an acute exogenic psychosis, analogous to those produced by alcohol, opium, cocaine, hashish, mescaline and the amphetamines (however, all these substances are only active in far higher doses [23]).

There is no uniform reaction to LSD. Two main types may be distinguished [6,10]:

(1) manic, expansive reaction with psychomotor excitement, euphoria and less frequently depression,

(2) a schizophrenic reaction with slowing of mental processes, inhibitions, autism, depersonalization and hallucinations.

The majority of subjects present a mixture of these two extreme types. Becker [6] attributes the manic response to the action of LSD on the sphere of intention and the schizophrenic reaction to the action of LSD on the sphere of affect.

In general, LSD tends to reinforce pre-existing tendencies, producing as a caricature of the subject [5]: the cyclothymic patient often becomes euphoric and expansive while the schizoid becomes a true schizophrene [6]. Thus LSD reveals latent

tendencies and its effect may be considered, to a certain degree, as a personality test [2,5,6].

LSD makes it possible for the psychiatrist to study in himself some of the mental symptoms which he is called upon to analyze and treat in his patients. This experience is often instructive [2,6].

LSD 25 and Mescaline: The first workers to carry out research were struck by the analogy between the 'intoxication' produced by LSD and mescaline delirium, although the active doses of these two products are quite different (mescaline at least 0.2 g s c, LSD generally less than 0.0001 g = 100 mg). An analogous relationship has been found when comparing the toxicity of the two substances in cold-blooded animals. The lethal dose of mescaline, in tadpoles, is 100-1000 times greater than that of LSD [8].

Various comparative studies carried out on the same subjects have shown that the mental effects of the two substances are not absolutely identical:

LSD produces, above all else, manic depressive or hebephrenic symptoms [8,11]. In other words, an expansive or foolish euphoria or periodic depression predominates while the hallucinations and depersonalization are fairly slight.

With mescaline, on the other hand, catatonic symptoms [8,11] such as restlessness, stupor, personality disturbances or hallucinations are predominant.

LSD and mescaline do not exert the same actions on nervous centers in lower animals. According to Witt [12] these two substances have opposite effects on the behavior of spiders (as determined by web pattern and purposefulness of the insects). An increase in anxiety occurred frequently with mescaline [19].

Mescaline produces fairly important changes in hepatic function demonstrable by the usual laboratory tests, whereas LSD produces a much slighter change which is only made evident by an ultrasensitive test [8].

e. Effects of LSD 25 on psychopathic patients: Generally psychopathic patients are much less sensitive to LSD than normal subjects [2,3,5]. The vegetative and motor effects often appear only after the administration of very high doses, e g two-three mg/Kg. Mental effects are generally less marked and difficult to evaluate in patients who have, in any case, similar symptoms before treatment

and in whom there may be very great spontaneous variations in effect[5]. It is also possible that the negative attitude and the tendency towards dissimulation typical of certain schizophrenics induces them to keep secret their experiences under the effect of LSD[2].

However, in practically every case there are certain behavior changes which are generally accentuated if the dosage of LSD is increased[4].

With regard to psychomotor affects, LSD generally produces, sometimes even in stuporous schizophrenics, an increase in activity and verbal expression[4,5,7] which may, especially in manic patients, develop as far as pronounced excitement[7,10].

After very high doses (300-500 mg) De Giacomo[3] observed in five cases out of 12 (3 schizophrenics, 2 oligophrenics) a preliminary phase of excitement followed by typical catatonia, during which the patient's face remained inexpressive while he maintained the same posture for several minutes. This phase lasted up to two hours.

As far as affect is concerned, the previous status can often be enhanced: depressive patients become still more depressed, manic patients still more euphoric[5,27]. In the majority of cases, however, the euphoric effect predominates[2,4,9,27]. Of the 21 schizophrenic patients reported by Hoch[19], seven exhibited euphoria, three alternating euphoria and depression, six depression, and six had a predominantly anxious reaction (total of 22 patients).

The improvement in verbal activity and in affect often facilitates contact with the patient[2,4,7]. Patients become more accessible[4,7,9], and memories hidden in the subconscious may be brought to the surface, particularly in cases of psychoneurosis[7].

The hallucinatory phenomena due to LSD seem to be less frequent and much less varied in psychopathic patients than in normal subjects[2,4,5,7]. The patient's spontaneous hallucinations may be activated[5]. In one case of chronic alcohol intoxication with previous episodes of hallucinosis, 100 mg LSD produced an extremely vivid hallucinations resembling the alcoholic delirium that the patient had experienced in the past[26]. In this case, the shock effect produced by this

experience seemed to exert a favorable action on the later evolution. In other cases it is possible to make a clear distinction between the usual hallucinations and those provoked by the drug [2,9].

Depersonalization in psychopathic patients clearly attributable to LSD has only been mentioned in a few cases [5,9]. Catatonic and paranoid features were intensified in some schizophrenic patients [19].

Possibilities of using LSD-25 in psychiatry: The effects described above make it possible to visualize the diagnostic and therapeutic use of LSD.

Personality test: Subjects response to LSD with euphoria, depression, schizoid manifestations, etc depends on their latent tendency. In psychopathic patients LSD enhances the pre-existing conditions and inclines to give a caricature of the patient. The intoxication of LSD thus makes it possible in many cases to determine the deep-seated tendencies of the subject and may be used, in this respect, as a personality test [2,5,6].

Psychoanalysis: In many cases LSD makes the patient more accessible to psychoanalysis by improving contact and facilitating the recall of memories. Busch and Johnson [7] have confirmed that analysis under the influence of LSD is not hampered by speech difficulties, such as frequently occur during barbiturate narco-analysis nor by the confusion which hampers analysis during insulin shock or immediately after electroshock. In patients reacting to LSD with heightened anxiety, contact was rendered more difficult.

Effect of 'shock': The sometimes extremely pronounced mental effects of LSD, particularly in normal individuals, may produce a feeling of hiatus in the life of the patient [6]. In psychopathic patients the action of LSD, at least in the usual dosage, is generally too slight to produce a useful shock effect [5]. As an exception, one case of alcoholic psychosis described by Benedetti [26] must be mentioned, in which the extremely vivid hallucinations produced by the LSD seemed to exert a favorable psychic effect.

Treatment of depression: The euphoric effect of LSD may be of use in the treatment of certain depressive states. However, one should not be too optimistic since, as a general rule, LSD tends rather to reinforce a pre-existing depression. Condrau [5] carried out trial treatment with daily doses of LSD in five depressive

patients. Only in two of them did he observe a slight improvement in affect. This result is not sufficient to be considered a therapeutic success. Savage[24] gave one month's treatment with daily oral doses of 20-100 µg to 11 patients with severe depressive reactions. Two suffering from involutional psychoses made a complete recovery, five schizoid patients with severe depressive reaction became free of depression, and four patients suffering from schizophrenic reaction with depression showed no change or became worse. The improvement obtained with LSD treatment was not greater than that obtained without LSD in comparable cases.

Experimental studies of the pathogenesis of psychosis: Theoretical interest in a substance such as LSD-25 which in infinitesimal doses is capable of reproducing a whole series of symptoms characteristic of endogenic psychoses may be noted. A detailed study of its mechanism of action may enlighten us as to the pathogenesis of psychoses[2,5,8,10]. The possibility of a psychiatrist studying in himself some mental symptoms is also of interest.

9. "REFERENCES

1. Stoll, A
Hofmann, A
Partialsynthese von Alkaloiden vom Typus des Ergobasins
Helv Chim Acta 26: 944, 1943.

2. Stoll, W A
a) Lysergsaure-diathylamid, ein Phantastikum aus der Mutterkorngruppe.
Schweis, Arch Neurol Psych 60: 279, 1947.
/Available on loan from CIA Library/
b) Psychischo Wirkung eines Mutterkornstoffee in ungewohnlich schwacher Dosierung
Schweiz med Wschr 79: 110, 1949.

3. De Giacomo, U
Catatonie toxique experimentale
Congres international de Psychiatrie, Paris 1950
Acta Neurol (Ital) 6: No 1, 1951

4. Forrer, G R
Goldner, R D
Experimental physiological studies with lysergic acid diethylamide (LSD 25)
Arch Neurol (Am). 65: 581, 1951
/Available on loan from CIA Library./

5. Condrau, G
Klinische Erfahrungen an Geisteskranken mit Lysergsaurs-Diathylamid
Acta psych neurol scand 24: 9, 1949.
/Available on loan from CIA Library/

6. Becker, A M
Zur Psychopathologie der Lysergsaurediathylamid-wirkung
Wien, Z Nerveahk. 2: 402, 1949. /Available on loan in CIA Library is English translation of summary./.

7. Busch, A K
Johnson, W C
LSD-25 as an aid in psychotherapy (Preliminary report of a new drug)
Dis Nerv System 11: 241, 1950.

8. Fischer, R
Georgi, F
Weber, R
Psychophysische Korrelationen- VIII Modellversuche zum Schizophrenieproblem. Lysergsaure-diathylamid und Mezcalin
Schweiz med Wschr 81: 817 & 837, 1951.

9. Rostafinski, M
Comamach doswiadezalnych u chorych na padaczke (Experimentally produced hallucinations in epileptic patients)
Reczu psychjatr (pol) 38: 109, 1950.

10. Rinkel, M
De Shon, H J
Hyde, K W
Solomon, H C
Experimental Schizophrenia-like Symptoms, abstract of paper Read before the American Psychiatric Association May, 1950
Amer J Psychiat 108: 572, 1952.
/Available on loan from CIA Library./

11. Matefi, L
Mezcalin- und Lysergsaurediathylamid-Rausch. Selbat-versuche mit besonderer Berucksichtigung eines Zeichentestes
Dissertation Basle 1951.
Confinia Neurol 12: 146, 1952.
/Available on loan from CIA Library./

12. Witt, P N
d-lysergsaure-diathylamid (LSD-25) in Spinnentest.
Experientia 7: 310, 1951.

13. De Shon, H J
Rinkel, M
Solomon, H C
Mental changes experimentally produced by LSD (d-lysergic acid diethylamide Tartrate)
Psychiatric Quart 26: 33, 1952.

14. Delay, J
Pichot, P
Diethylamide de l'acide d-lysergique et troubles psychiques de l'ergotisme
C R Soc Biol 145: 1609, 1951.

15. Delay, J
Lhermitte, F
Verdeaux, G
Verdeaux, J
Modifications de l'electrocortisogramme du lapin par la diethylamide de l'acide d-lysergique (LSD-25)
Revue Neurelogique 86: 81, 1952.

16. Weyl, B
Versuch einer psychopathologischen Analyse der der LSD-Wirkung
Diss, Freiburg i Br 1951.

17. Mayer-Gross, W
McAdam, W
Walker, J W
Psychological and biological effects of lysergic acid diethylamide
Nature 168: 827, 1951.

18. Buscaino, G A
Studio quantitativo dell apettro di fluorescenza dell dietilamide dell'acido lisergico
Ricerca scientifica 21: 519, 1951.

19. Hoch, P H
Cattell, J P
Pennes, H H
Effects of mescaline and lysergic acid (d-LSD-25)
Am J Psychiat 108: 579, 1952.

20. Hoch, P H
Cattell, J P
Pennes, H H
Effects of drugs
Am J Psychiat 108: 585, 1952.

21. Mayer-Gross, W
McAdam, W
Walker, J
Lysergsaure-Diathylamid und Kohlehydratstoff-wechsel
Norvenarst 23: 30, 1952

22. Cornforth, J W
Long, D A
Influence of organic phosphates on tuberculin sensitivity in B C G infected guinea pigs. Relation to Cortisone desensitization
Lancet 262: 950, 1952.

23. Blickenstorfer, E
Zum atiologischen Problem der Psychosen vom akuten exogenen Reaktionstypus. Lysergsaure-diathylamid, ein psychisch wirkeamer toxischer Spurenstoff
Arch f Psychiatrie & Etschr Neurol 188: 226, 1952.
/Available on loan from CIA Library/

24. Savage, C
Lysergic acid diethylamide (LSD-25) - A clinical-psychological study,
Am J Psychiat. 108: 896, 1952.

25. Rothlin, E
Gerletti, A
Uber einige pharmakologische Untersuchungen an Mausen mit congenitalar Drehsucht
Helv Physiol. Acta 10: 319, 1952.
/Available on loan from CIA Library/

26. Benedetti, G
Beispiel einer, strukturanalytiachen und pharmakodynamischen Untersuchung an einem Fall von Alkoholhalluzinoso, Charakterneurose und Psychoreaktiver Halluzinose
Z f Psychotherapic u med Psychol. 1: 176, 1951
/Available on loan from CIA Library./

27. Delsanti, R
Modificazioni Neuro-psico-biochimiche indotte dalla dietilamido dell-'acido lisergico in schizofrenici e frenastenici
Acta. Neurol (Ital) 7: 340, 1952."

- end -

LIBRARY SUBJECT & AREA CODES

614.44 - 29M
644.01 - 29M
644.57 - 29M
614.92 - 29M

DANICE

SENDER WILL CHECK CLASSIFICATION TOP AND BOTTOM

UNCLASSIFIED | CONFIDENTIAL | SECRET

OFFICIAL ROUTING SLIP

TO	NAME AND ADDRESS	DATE	INITIALS
1	[redacted] Review Staff		
2			
3			
4			
5			
6			

STATINTL

	ACTION		DIRECT REPLY		PREPARE REPLY
	APPROVAL		DISPATCH		RECOMMENDATION
	COMMENT		FILE		RETURN
	CONCURRENCE		INFORMATION		SIGNATURE

Remarks:

Attached are three copies of the 20 August 1975 memorandum with attachments. Note that the documents required additional coordination and because of this were not fully classified or stamped IMPDET.

FOLD HERE TO RETURN TO SENDER

FROM: NAME, ADDRESS AND PHONE NO.	DATE
[redacted]	8 20 75

STATINTL

UNCLASSIFIED | CONFIDENTIAL | SECRET

FORM NO. 1-67 237 Use previous editions ☆ GPO : 1974 O - 535-857 (40)